2.0 Purpose

The purpose of this document is to present the findings of the field investigation and concept design study, as well as recommend appropriate track relocation and bridge modifications to provide the maximum contiguous land for redevelopment within the limits of the North West Triangle (NWT) as shown on **Figure B**.

This study is a conceptual-level investigation and set of recommendations and is not meant to serve as an engineering or design document. Further investigation and engineering will be required for any subsequent design.

3.0 Work Plan

The method and criteria used for determining track relocation and bridge modifications shown here were developed with the following sequence of production and reviews:

1. Collect and review previous studies and reports concerning the North West Triangle.
2. Obtain mapping, bridge plans and various materials from York Railway and the City.
3. Conduct field investigation of existing facilities.
4. Conduct interview with York Railway officials (T. Lanni) for operations overview.
5. Develop concept track layout.
6. Develop project cost estimates.
7. Summarize findings and provide recommendations.
8. Review DRAFT Report with City and York Railway.
9. Revise Report to include review comments and issue FINAL Report.

The basic criteria used to establish and evaluate the proposed relocation and bridge modifications was established by HDR based on discussions with the City, York Railway and previous track / bridge design experience. The project specific criteria includes:

- Maintain alignment of the existing York Railway Mainline (former Western Maryland main).
- Relocate Central Branch within NWT and remove West Branch from NWT.
- Provide degree of curve on Central Branch suitable for 10-mph train operations.
- Provide minimum 100-ft tangent track between reverse curves.
- Upgrade Bridge No. 15.60 to provide load capacity equal to or greater than Bridge No. 13.52.
- Convert Bridge No. 13.52 to pedestrian walkway over Codorus Creek.
- Maintain access to York Railway warehouse, and NS Connection.
- Assume Agmark facility and related track / pits may be relocated or removed.
- Avoid curves or turnouts within grade-crossings.
- Minimum acceptable radius is 460-ft, which is equal to a No. 8 turnout.
- Maximum car length = 60-ft. and use current AREMA bridge loading (Cooper E-80).

Note: Surveying was not performed as part of this concept design effort; however such information will be required for any subsequent design.

4.0 Data and Information Sources

Sources of data and information used to prepare this report include:

Data	Source	Date
Valuation Maps	York Railway	Not Available
GIS Mapping	City of York	Not Available
Bridge Plans (Br. No. 15.60)	CSX Transportation	1895
Bridge Inspection Report	York Railway	
Railroad Relocation Design Report	City of York (PB)	1998
ADC York Co. Map	ADC – Map People	2001

5.0 Operations Overview

HDR conducted an interview with York Railway officials to gain a greater appreciation for rail operations within and adjacent to the limits of the North West Triangle. The following information was provided by Mr. Tom Lanni, General Manager of York Railway and was considered during the concept design process.

Listed below are the general operations for each branch owned by York Railway within the North West Triangle. Please note **Figure A** which demonstrates how York Railway lines converge over Codorus Creek and from points south and east within the limits of the North West Triangle.

Note: Values shown below for 2005 are denoted with an asterisk (*) and represent the period from January through June 2005.

5.1 Existing Operations:

Central Branch (former Maryland & Pennsylvania Railroad)

- Customers: Scrap Dealer, Festermans, American Rock Salt
- Annual Traffic: 710-cpy (cars/year) 2004, 980-cpy 2005* (approx. 1500 anticipated)

Note: Daily traffic on the central branch may reach a maximum of 15-cpd, but must be delivered in 5-car train sets due to customer limitations.

York Railway's maximum length and weight car are the jumbo covered hoppers (60-ft long, 100-ton lading) used for salt deliveries on the Central Branch.

West Branch (former Maryland & Pennsylvania Railroad)

- Customers: Ohio Blender, York Railway Warehouse (serving ES3)
- Annual Traffic:
  Ohio Blender: 109-cpy 2004, 54-cpy 2005*
  Warehouse: 1694-cpy 2004, 853-cpy 2005*, (approx. 5200 anticipated)

York Mainline (former Western Maryland Railroad)

- Customer: Agmark

This operation includes an agricultural materials transloading facility at the former Western Maryland freight house, but provides no storage. Note this facility is owned by York Railway.

- Annual Traffic: 1650-cpy 2004, 551-cpy 2005*

Traffic generated from other railroads includes 7283-cars from *Norfolk Southern* in 2004, and 2970-cars in 2005* as well as 1300-cars from *CSX* in 2004 and 683-cars in 2005*. The balance of cars not enumerated above were for delivered to other customers outside the immediate vicinity of the Northwest Triangle, however, much of this freight passed through the NWT.

Based on the freight movements noted above combined with multiple switching operations due to limited storage space, York Railway estimates that there may be some locations within the Northwest Triangle that see as many as 40,000-cars over a single point in one year. York Railway currently operates two shifts in order to accommodate the current traffic and multiple switching operations.

In the period between 2000 and 2005, York Railway generated approximately $3 Million in revenue from transportation of agricultural goods for the Agmark and Ohio Blender facilities.

5.2 Future Operations:

York Railway is currently planning for additional traffic to serve ES3, their single largest customer. ES3 will soon complete additions to the York County Warehouse and has recently added new customers, all of which means additional freight. York Railway is investigating development and use of a new transloading facility between Codorus Creek and Loucks Mill Road. This project has been delayed, if not postponed, due to negotiation between ES3 and the property owner. York Railway intends to continue their operations from their warehouse at N. Queen St. and has considered expanding the facility to manage additional freight. If another facility were to open York Railway has indicated that they intend to maintain their warehouse facility to develop new business within the City.

5.3 Planned City Redevelopment:

York Railway has indicated that any changes or redevelopment within the North West Triangle or areas adjacent which are served by their tracks or facilities would disrupt or eliminate their business operations. As noted above and demonstrated on **Figure A**, all York Railway tracks converge within the North West Triangle.

City plans for redevelopment within the North West Triangle present challenges for both safety and operations. York Railway does not promote placing pedestrian traffic in close proximity to operating tracks, but might find the proposed changes acceptable if special provisions were made to limit access points and use barriers elsewhere. Such provisions may include pedestrian gates, fencing, or trees and shrubs. In addition, lighting and signs may be added for safety and security.

6.0 Track Alignment

6.1 Existing:

York Railway currently operates on three lines within the NWT, the Central Branch, serving points south, the West Branch and the Mainline. These lines are demonstrated in **Figure B** – Proposed Track Alignment. The tracks are arranged so they may deliver cars to the Agmark, Ohio Blender, and the Warehouse facilities. The West branch and Mainline are connected on the north bank of Codorus Creek opposite the North West Triangle, therefore requiring both Bridge No. 15.60 and Bridge No. 13.52.

6.2 Proposed:

The track configuration in **Figure B** uses a 10-degree curve and a reverse curve to move the Central branch southwest towards Br. No. 13.52 and a No. 8 turnout for connection to the Mainline. The Mainline and Central Branch leading to the Norfolk Southern connection are connected using No. 8 turnouts and a reverse curve. This connection is required for York Railway to receive deliveries from Norfolk Southern through Poor House Yard.

7.0 Bridge Investigation

7.1 Existing:

As part of this study HDR has reviewed recent bridge inspection reports and load rating summaries provided by York Railway. HDR has not conducted a bridge inspection or load rating as part of this concept design study. A summary of findings is noted below.

Bridge No. 15.60 (Through-Truss):

Bridge No. 15.60, formerly owned and maintained by the Western Maryland Railroad, is a two-span, through-pin-truss (TPT) bridge approximately 286-ft long. According to original plans obtained from CSX Transportation each truss is 140'-7" measured from pin to pin and was constructed in 1895-96. Please see **Figure D** for details. An elevation view of the bridge is shown below in **Photo 7.1A**. The bridge is load rated for 288,000-lbs. cars. A review of the 2003 inspection report indicates that the bridge is in good / fair condition overall. The areas noted with deficiencies were generally non-structural. The pin-connected truss is an antiquated construction method that requires maintenance to compensate for inevitable pin wear. Through trusses limit both horizontal and vertical clearances. It appears that this bridge is not structurally adequate or does not provide adequate clearance for some car movements on the York Railway system. It is also worth noting that this bridge is built on a 2-deg. 30-min. curve and a skew. These factors combined complicated the geometry of the bridge for design, fabrication, and construction.

Bridge No. 13.52 (Through-Plate Girder)

Bridge No. 13.52 formerly owned and maintained by the Maryland and Pennsylvania Railroad, is a two-span, through-plate-girder (TPG) bridge approximately 218-ft. long. According to inspection reports each span is approximately 109-ft long. Original plans were not available and the construction date is unknown. The bridge is load rated for 315,000-lbs. cars. A review of the 2003 inspection report indicates that the bridge is in good / fair condition overall. The areas

noted with deficiencies were generally non-structural. The through-plate-girder limits horizontal clearances, but not vertical. It appears that York Railway uses this bridge for car movements that can not be carried over Bridge No. 15.60 due to structural capacity or vertical clearances. Removing this bridge from the York Railway systems would inhibit freight movements.

7.2 Proposed:

City plans for redevelopment within the NWT, as presented here, would require removing Bridge No. 13.52 (TPG) from rail service and rehabilitating or replacing Bridge No.15.60 (TPT). Engineering concepts for such work are presented below.

Bridge No. 15.60 (Through-Truss):

Rehabilitating the trusses to provide additional vertical clearance and load-carrying capacity may be possible; however, the engineering and construction challenges related to such work may far outweigh the cost of superstructure replacement.

Replacing the bridge would require a great amount of work as well, including planning, permitting, design and construction.

Based on previous experience, HDR presumes that the U.S. Army Corps of Engineers would not permit changes in the waterway opening or the construction within the floodway or flood plain that would significantly impact the 100-year flood surface elevation. This limitation would require replacing the spans on the existing substructure (pier and abutments) with some modifications to accommodate the new superstructure. The existing span length may require use of new trusses. New through-plate-girder spans may be used for the replacement. The fact that the bridge is built on a curve and skew will design parameters and construction costs.

Based on discussions with York Railway and previous experience HDR has prepared this concept design and related cost estimate based on a span change-out, where the contractor may employ a “roll-in / roll-out” method of replacing the spans. This technique is frequently used on railroad structures where interruptions to train movements must be kept to a minimum. This technique might employ the following sequence:

1. Complete modifications to the existing substructure (pier and abutments).
2. Erect new spans parallel to the existing bridge on temporary supports.
3. Lift (slightly jack) old spans and roll them onto adjacent temporary supports.
4. Roll new spans onto existing substructure.

The preparation work for this technique may require several months of labor, but the actual change out can typically be completed in a very short period (1-3 days). York Railway has indicated that they may be able to stage freight and locomotives on both sides of Codorus Creek so that there are no major interruptions to their deliveries during the brief track outage for span change-out.

Additionally, and related to track construction, York Railway has indicated that they may be able to move most of their freight over Bridge No. 15.60 once Bridge No. 13.52 is closed for adjacent redevelopment construction. This would be limited to the short period between closure of Bridge No. 13.52 to allow stadium construction to begin and span replacement at Bridge No. 15.60.

Bridge No. 13.52 (Through-Plate Girder)

The City has indicated a desire to use Bridge No. 13.52 (TPG) as a pedestrian structure for access over Codorus Creek to the NWT redevelopment area. This would require converting the existing open-deck spans to a walkway complete with deck and handrails. This type of construction is common to railroad bridges within rails-to-trails corridors and is a relatively straightforward design and construction. Major challenges may include determining the existing geometry and thoroughly assessing the bridge condition. It is assumed that the proposed conversion will not require any major structural repairs or painting, both of which could add significant cost.

8.0 Estimate of Probable Construction Cost

Based on the assumptions and details of the concept design shown above, HDR has prepared **Table 8.1** – Estimate of Probable Construction Cost. This estimate considers major work items for demolition and construction of track an as related to the trackwork, bridge construction

9.0 Summary and Recommendation

HDR has determined that the track relocation, bridge construction, and proposed redevelopment within the North West Triangle are feasible as presented here. The implications of the proposed construction to York Railway operations are considerable. The long-term effects include increased track maintenance through the 10-degree curve and removing two customers (Agmark and Ohio Blender) from the site.

Alternatives which the City may consider:

1. Due to the cost of the bridge reconstruction, consider further investigation which may provide more land for redevelopment but not a parcel large enough for a baseball stadium within the NWT that would preclude replacing the existing truss.

2. Due to the major impacts to York Railway operations, consider further investigation which places the proposed stadium at the Arch St. location but relocates the York Railway warehouse to an appropriate location which does not disrupt or eliminate business operations. Note: Cost to relocate the warehouse may be less than cost for Bridge No. 15.60 superstructure replacement.

10.0 Anticipated Project Schedule and Sequence of Construction

Based on the assumptions and details of the concept design shown above HDR has prepared **Figure C** - Anticipated Project Schedule. This schedule includes a general timetable for the major work items for design, permitting and construction as related to the trackwork, bridge construction and stadium construction / redevelopment. Note: HDR has not considered the sequence or duration of stadium construction as part of this study, other than to determine the constructability of track and bridge facilities adjacent to the proposed stadium site within the NWT.

11.0 Drawing and Figures

HDR has prepared several drawings and figures to demonstrate the results of this study. These figures are listed below. Additionally HDR has provided several figures based on materials provided by other, also noted below.

Prepared by HDR:
Figure A Location Map
Figure B Proposed Track Alignment
Figure C Anticipated Project Schedule

Provided by Others:
Figure D Original Plans for Bridge No. 15.60 over Codorus Crek
Figure E Bridge Load Rating Summary
Figure F 2003 Bridge Inspection Reports